NCNR Expansion Initiative Review Panel

Richard Ibberson

4 – 5 June, 2012

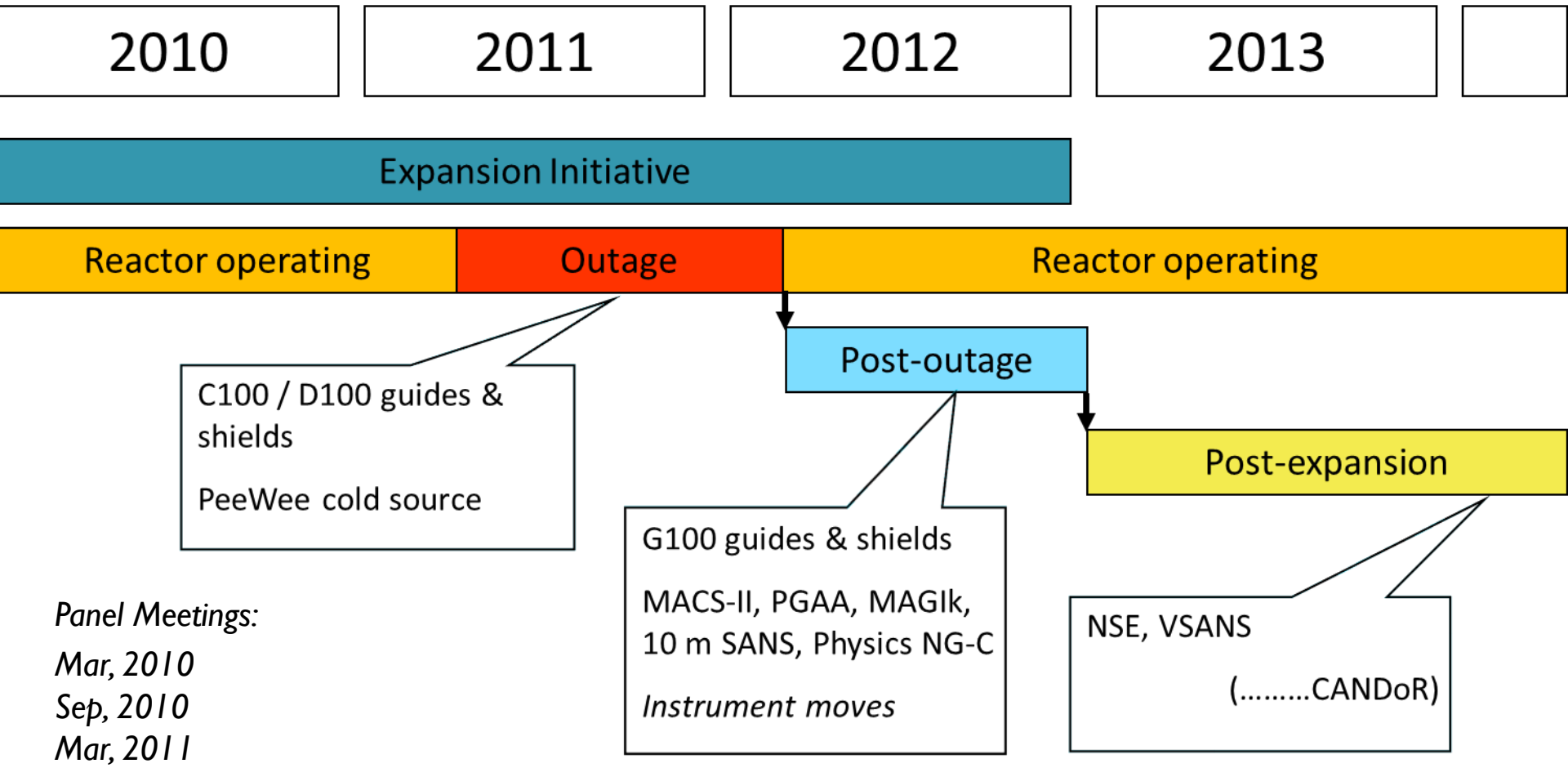
NIST Center for Neutron Research

Overview

- Outage retrospective
  - Schedule variance & Risk Management
  - non-Expansion activities
- Current Facility Status
  - Reactor re-start
- Outlook
  - RFO Staffing
  - Jun-Dec, 2012
  - 2013

Research Facility Operations

Forward Look



Panel Meetings:

Mar, 2010
Sep, 2010
Mar, 2011

Outage

- ✓ remove NG-1 REFL and AND/R
- ✓ remove MACS from NG0
- ✓ remove BT-9 TAS
- ✓ relocate cold source systems
- ✓ install Pee-Wee cold source at BT-9
- ✓ test Pee-Wee cold source
- ✓ install new pool liner
- ✓ install & align neutron
- ✓ guides, casings, and shielding in C-100
- ✓ install & align neutron guides, casings, and shielding in D-100
- ✓ Re-commission instruments

- ✓ SCPB
- ✓ thermal shield upgrade
- ✓ electrical substation
- ✓ additional cooling tower cell
- ✓ compressor building
- ✓ security road

End of CY12

- install & align neutron guides (NG-B➢D), casings, and shielding in the guide hall
- ✓ E135 renovation
- install/commission NG-1 PBR (NG-D)
- install/commission MAGIk (NG-D)
- install/commission 10m SANS (NG-B)
- install/commission PGAA (NG-D)
- install/commission Physics (NG-D)
- relocate/install MACS (BT-9)

Risk Register – Expansion Initiative

Project Name: NCNR Expansion Initiative	Manager: James Bartlett	Customer / Sponsor: Robert Dimeo
Sub–Project Name: Summary	Manager:	Progress Date: February 2011

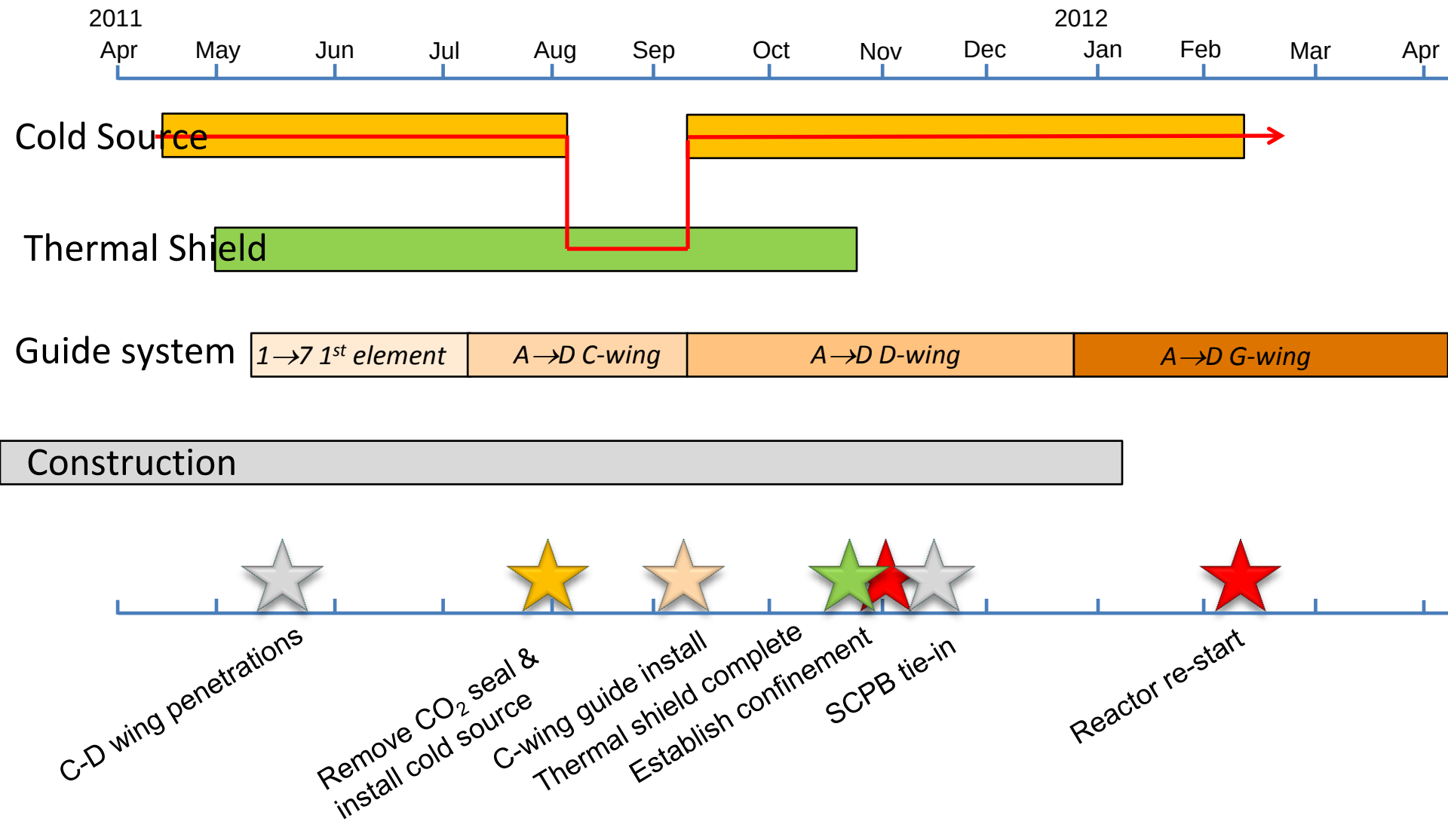
Risk No.	Sub-Project	Risk	Likeli-hood	Impact	Mitigation Strategy	Risk Owner
1	Secondary Cooling Pump Building & related construction activities	Late completion leading to delays in completion of outage tasks	M	H	Close supervision of construction; weekly construction progress reviews; close coordination with Plant management; delay in reactor start-up	JB, Plant Div.
2	Guides and casings installation	Late completion	L	H	Devote additional resources to engineering, careful planning of work	Mike Murbach
3	New BT-9 Cold Source	Delays during installation	M	H	Initial design and full-scale mock-up completed well in advance; dedicated welder for assembly The most demanding part of the installation is removal of the CO_2 seal, and this part of the evolution has been fully mocked up and tested.	Paul Kopetka, Robert Williams
4	Thermal Shield	Delayed completion Failure of concept	M L	H H	Development of detailed work Plan This would be a major failure, but extensive testing gives assurance that probability is low	Tony Norbedo, Paul Brand
5	Fuel Storage Pool Storage Liner	Delays reactor restart (after 1 cycle)	M	M	Development of detailed work plan and installation procedure	Paul Liposky
6	Neutron Instruments	Late start Funding inadequate	H M	M H	Extra resources after guide and shielding design complete Seeking outside funds to augment effort	Richard Ibberson
7	Control Room data acquisition system	Delays other outage tasks	L	M	Development of detailed work plan. Close co-ordination with other outage tasks.	Joe Ryenga

Risk rankings – Impact/ Likelihood: Low, Medium, High

Risk status - Red = Active & impacting project; Yellow = Active but contained without impact to cost & schedule;
White = present but not active; Green = no longer active or retired.

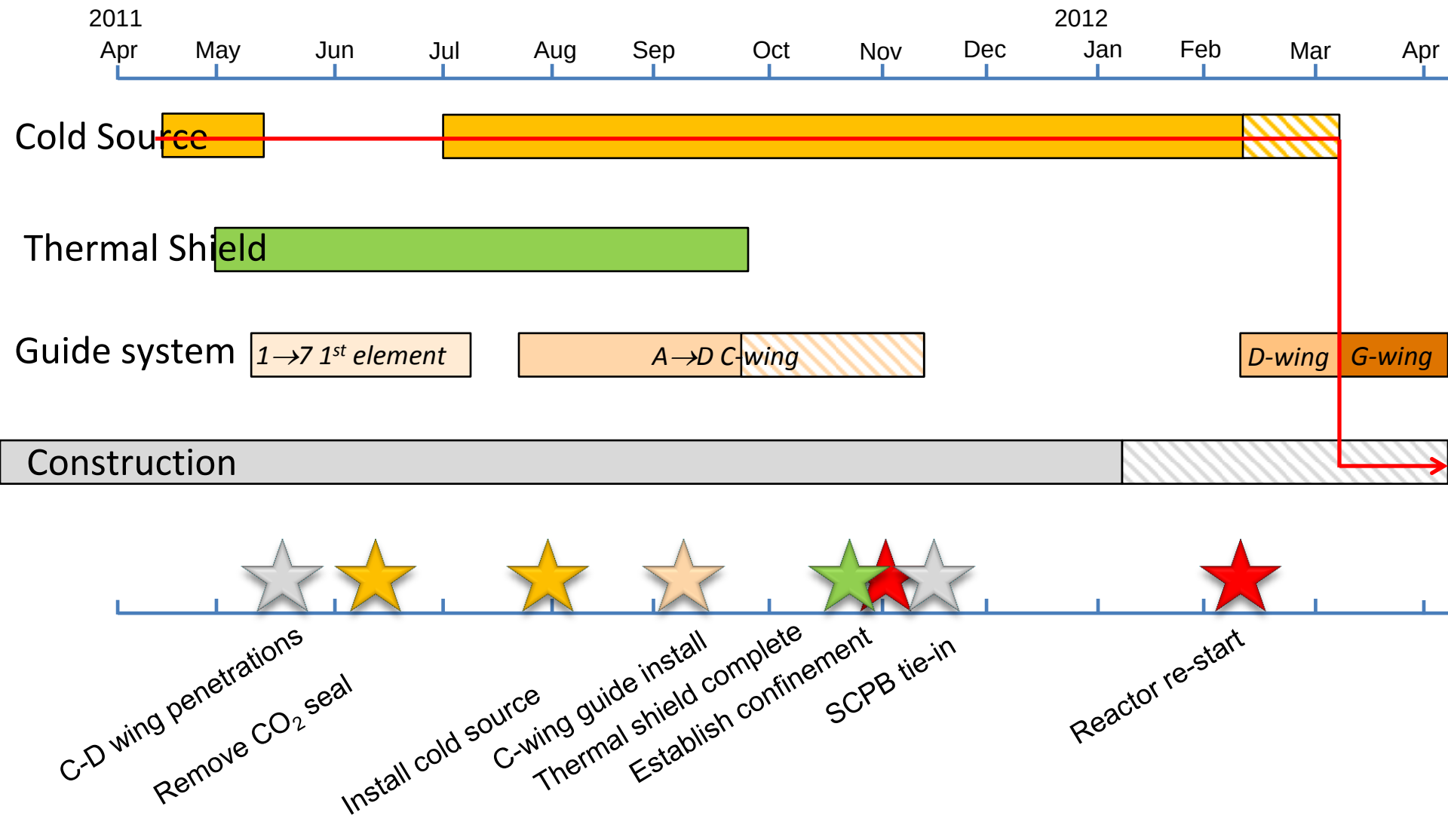
Outage Installation Schedule

Critical evolutions & milestones for re-start (April 2011)

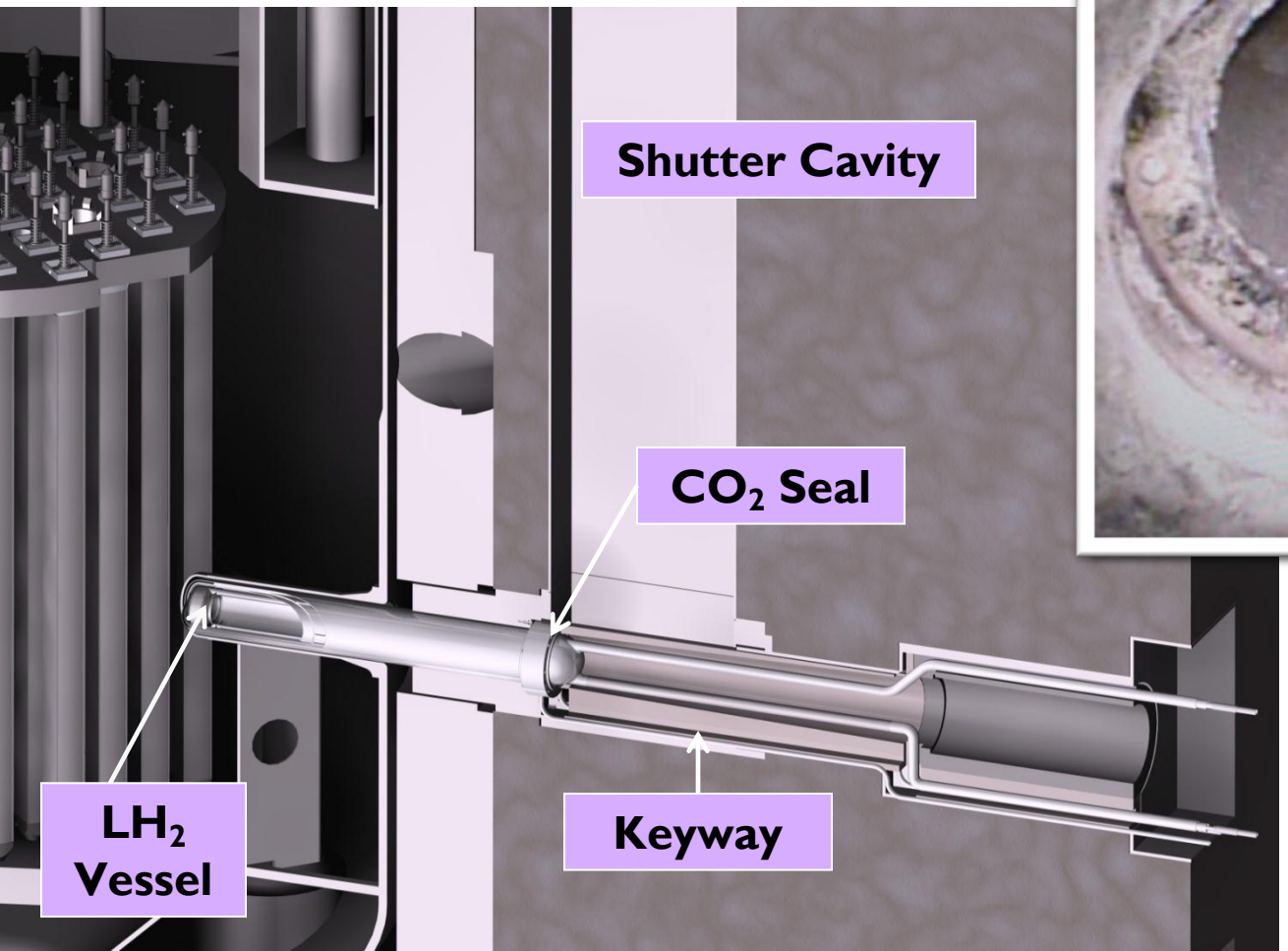


Outage Installation Schedule

Critical evolutions & milestones for re-start



Installation of Pee-Wee cold source at BT-9

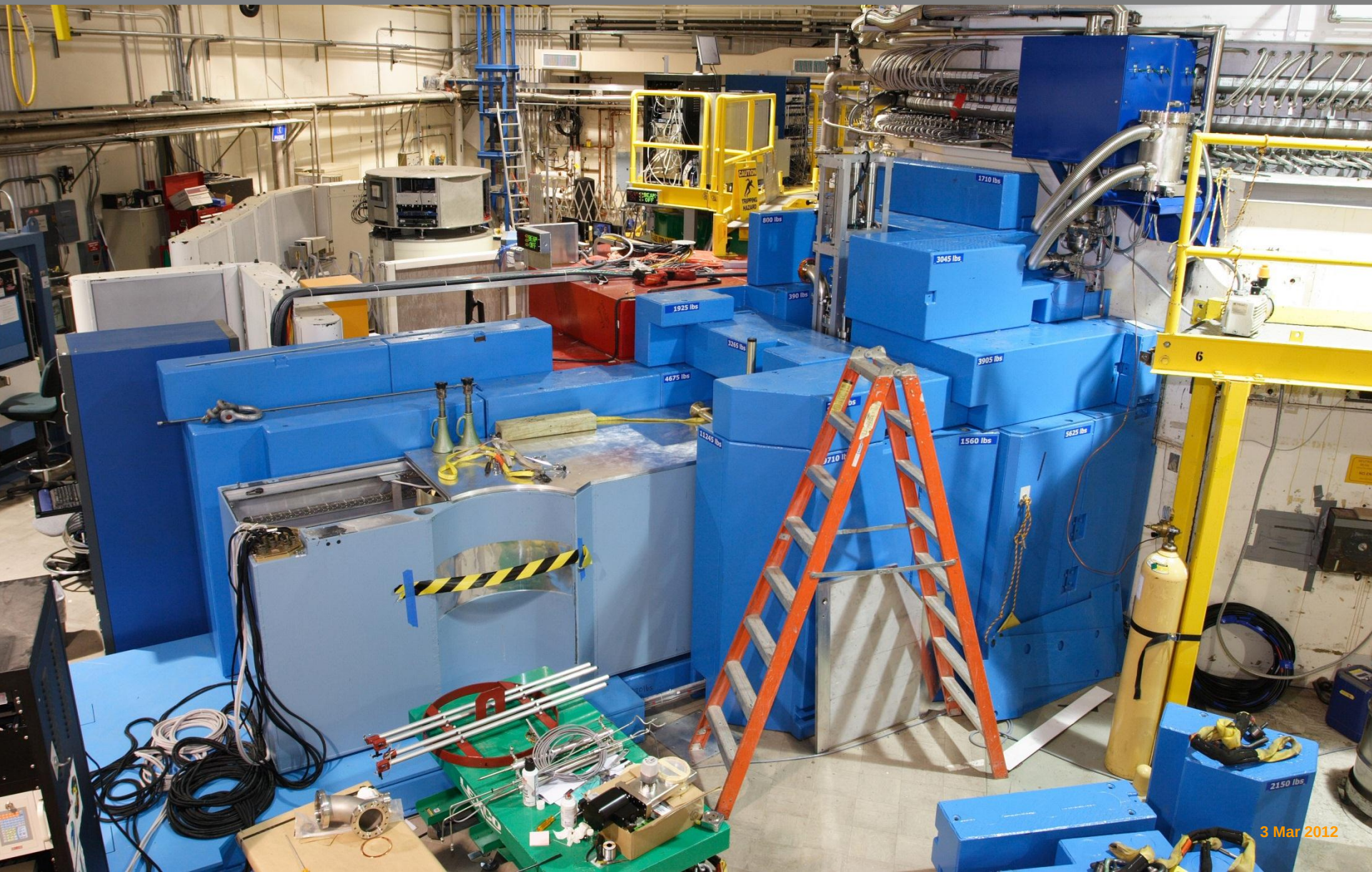


Re-bore operation at BT-9

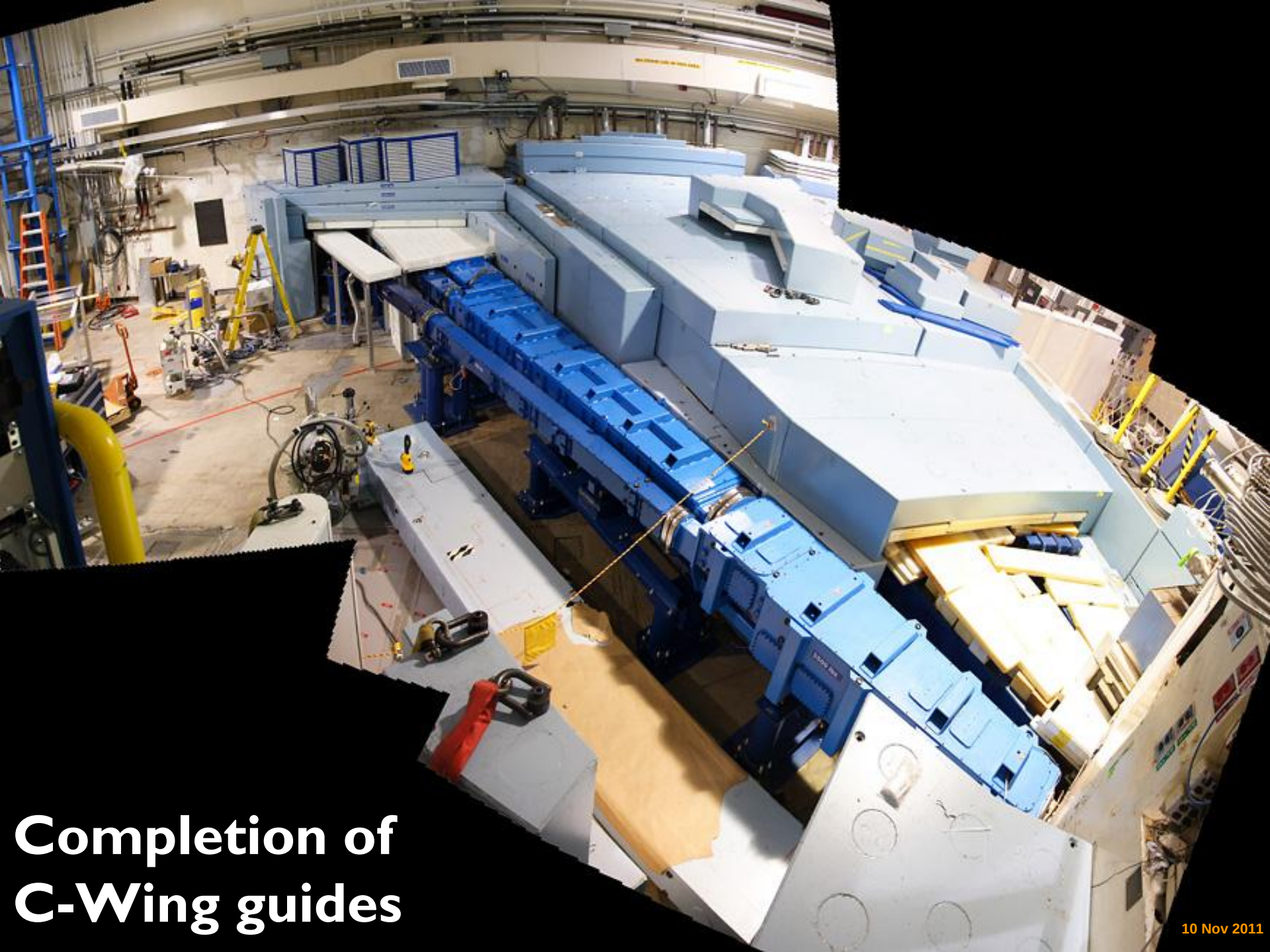
Installation of Pee-Wee cold source at BT-9

Installation of MACS at BT-9

Installation of MACS at BT-9



C-100 Guide Installation



Completion of C-Wing guides

10 Nov 2011

Risk Register – Construction

Project Name: ARRA Construction	Manager: Jim Bartlett	Customer / Sponsor: NCNR
Sub–Project Name: Summary	Manager: Jim Bartlett	Progress Date: February 2011

Risk No.	Activity	Risk	Likelihood	Impact	Mitigation Strategy	Risk Owner
1	SCPB Construction	Late delivery	M	H	Delays Restart - monitor construction schedule weekly	Jim B/COTR
		Incorrect installation	L	H	Delays Restart - monitor construction schedule weekly	Jim B/COTR
2	D-Wing: I-beams	Late installation	M	M	Delays G&S Installation in D-Wing - Monitor schedule	Jim B/COTR
3	D-Wing: Drill Holes	Late/incorrect	M	H	Delays G&S in C-100 - Monitor Schedule weekly	Jim B/COTR
4	D-Wing: Design change order	Late design	M	M	Delays Construction - track progress	Jim B/COTR
		C/O too costly	M	H	Need Alternative/schedule delay - review alternatives	Jim B/COTR
		Late construction	M	H	Delays G&S in D-100 - Monitor Schedule weekly	Jim B/COTR
5	SCPB Commissioning	System doesn't perform as desired	M	H	Delays Restart - close review of calculations	Jim B/COTR
		Control wiring issues to Control Room	M	H	Delays Restart - close coordination with COTR during commissioning; carefully check NCNR wiring to CR	Jim B/COTR
6	Substation	Late delivery	M	M	Delays other project - Monitor Schedule weekly	Jim B/COTR
7	Compressor Building	Late delivery	M	L	Not available for storage - Monitor Schedule weekly	Jim B/COTR

Risk rankings – Impact/ Likelihood: Low, Medium, High

Risk status - Red = Active & impacting project; Yellow = Active but contained without impact to cost & schedule;
White = present but not active; Green = no longer active or retired.

Construction

Contractor Scheduling

Construction

Oversight

Construction: D-wing

17 Nov 2011


6 Dec 2011


3 Jan 2012


9 Feb 2012

D-wing Guide Installation

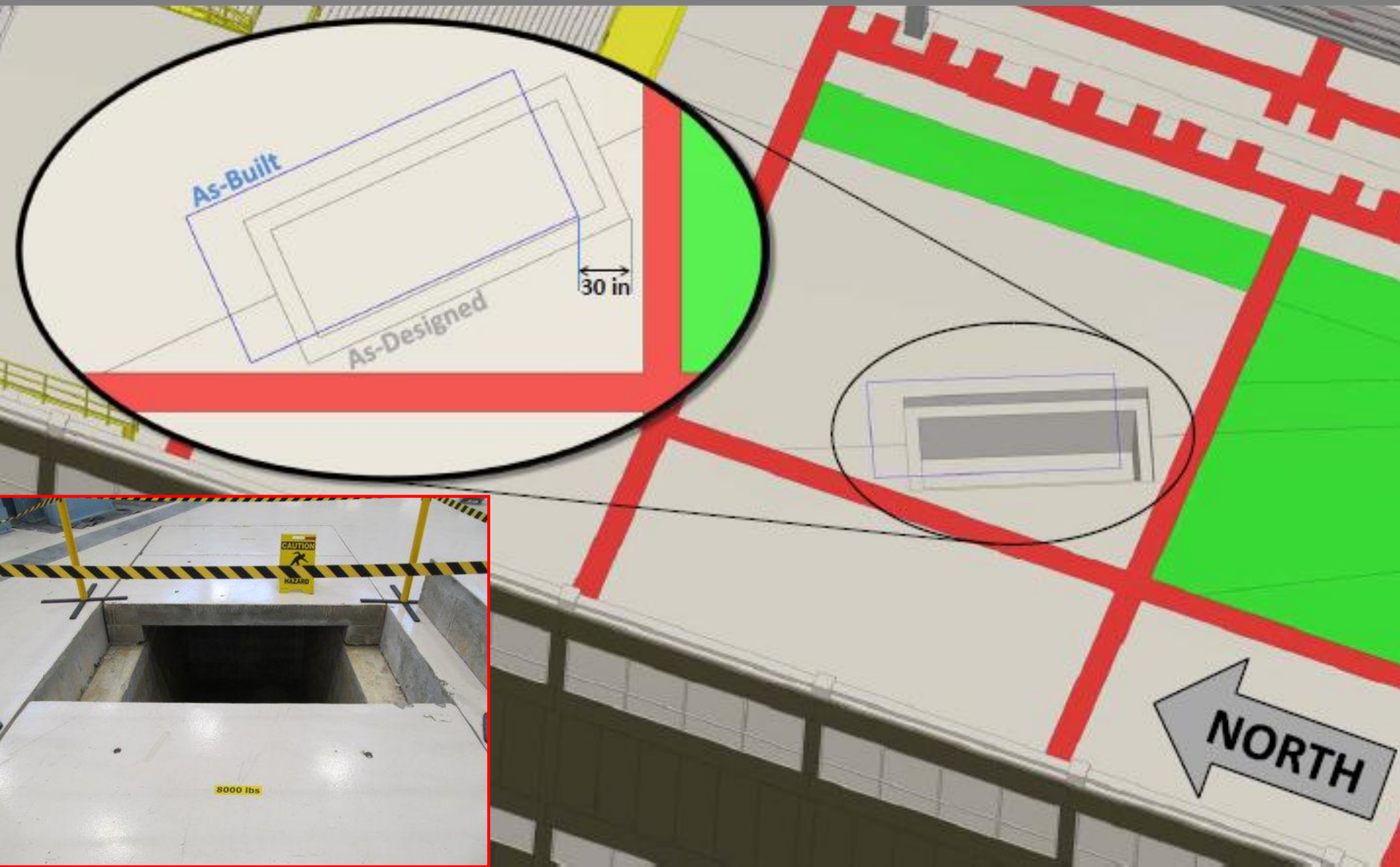
14 February – 4 March, 2012

D-wing Shielding Installation

6 – 8 March, 2012

Another construction project?

Remediation of NG-C pit



Overview

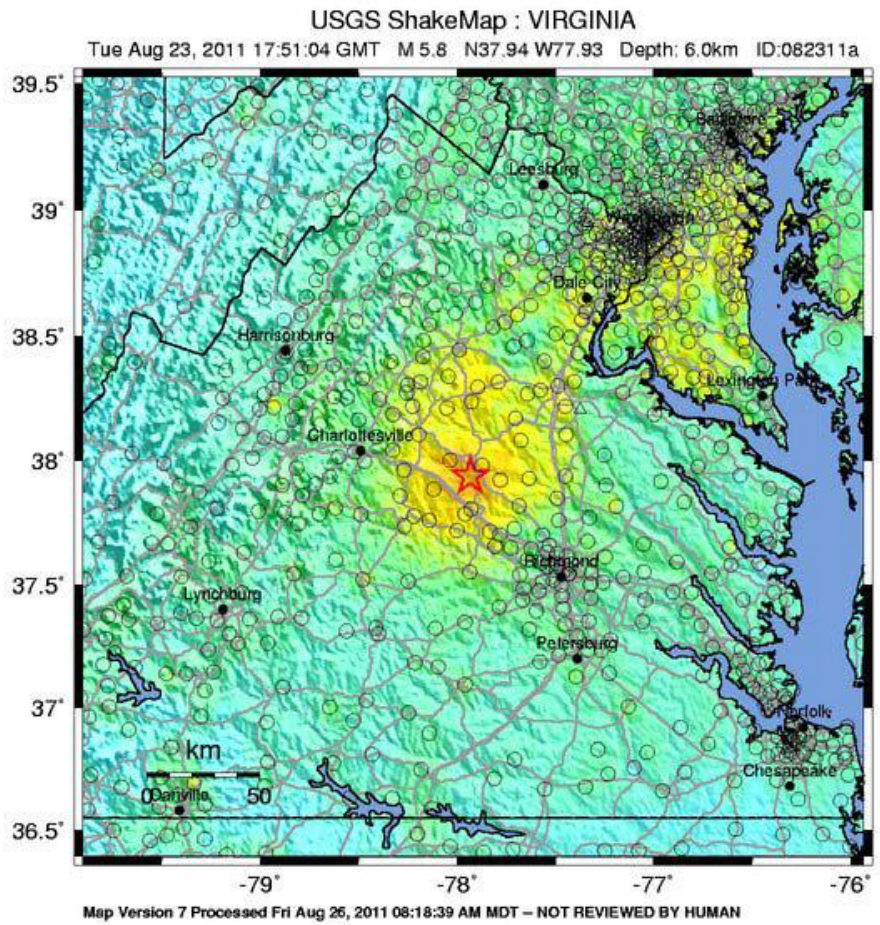
- Outage retrospective
  - Schedule variance & Risk Management
  - non-Expansion activities
- Current Facility Status
  - Reactor re-start
- Outlook
  - RFO Staffing
  - Jun-Dec, 2012
  - 2013

On a sunny Summers day in August……

August 23, 2011

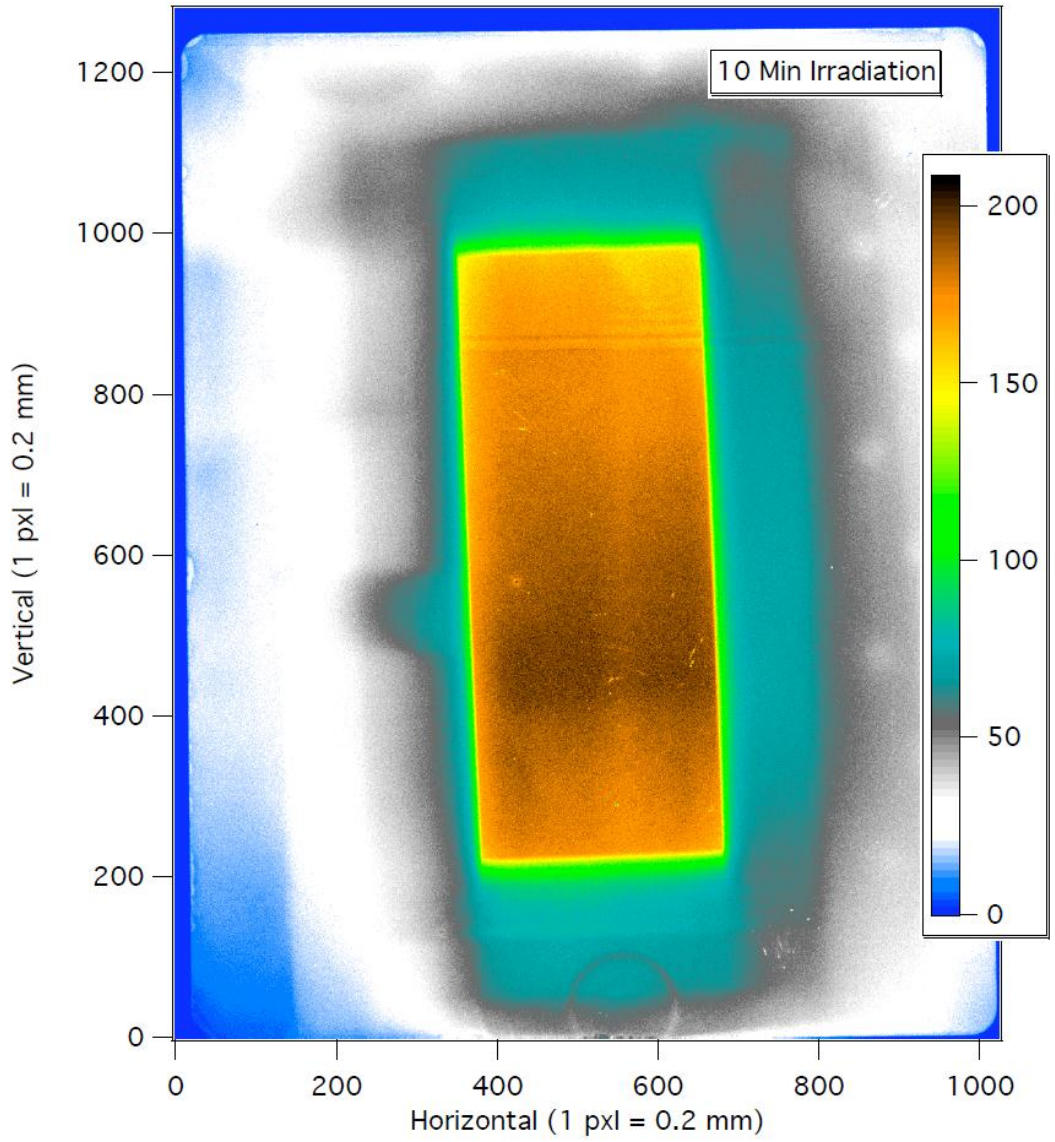
m = 5.8 earthquake

centered in Mineral, VA
(90 miles from NCNR)



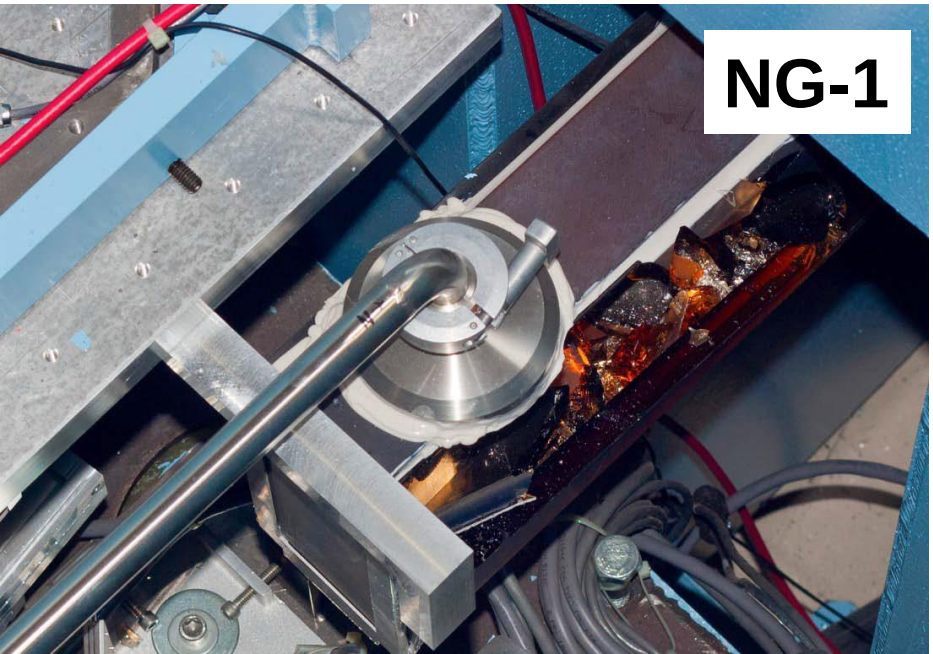
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	*8.1-16*	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Did NG-1→4 in-pile elements survive?



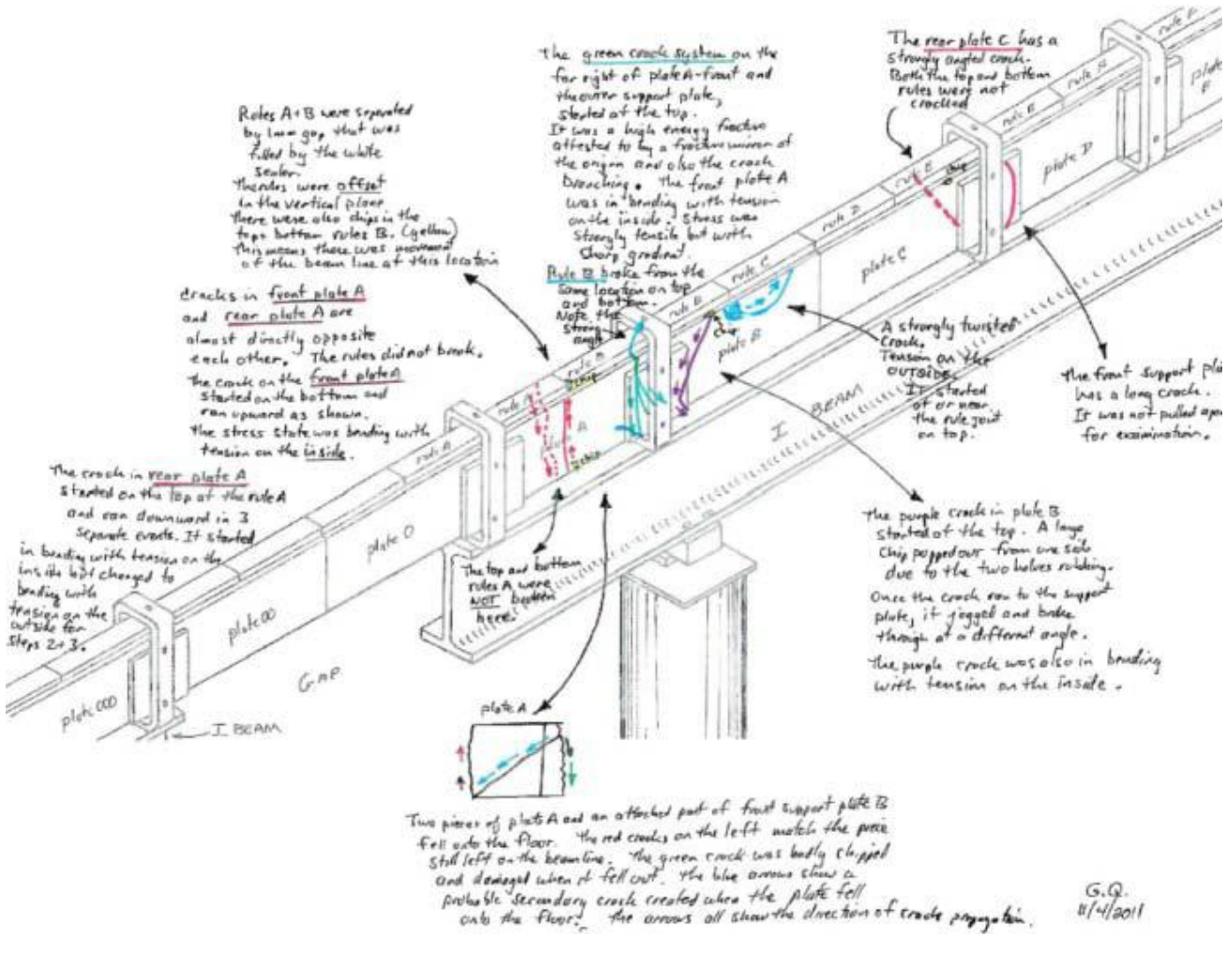
A bad week for guides…

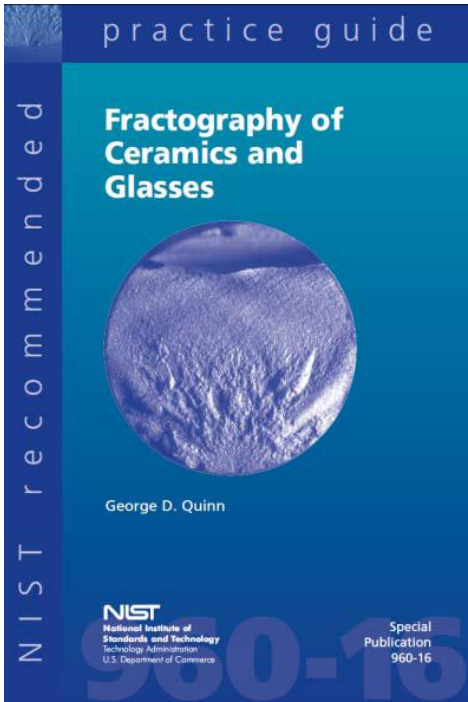
19-23 September, 2011



Investigation into the mechanical cause of failure of NG-2

O. Zilcha, G.D. Quinn, J.M. Rowe, D.J. Pierce





"Non-Expansion" Projects – G100

- Guide mask & window replacement program (on-going)
- Guide repairs NG-1 & NG-2
- Reinstate NG-1 NDP
- Install & commission detector development facility on NG-1
- Install new guide cut on NG-7 interferometer
- New electrical power feeds: NG-1; NG-2; NG-4; NG-5 SPINS; PBR; MAGIk (*NIST Plant*)
- He recovery piping (*Contractor*)

2011 Innovation in Measurement Science

Energy Dispersive Neutron Detectors for Steady-State Sources

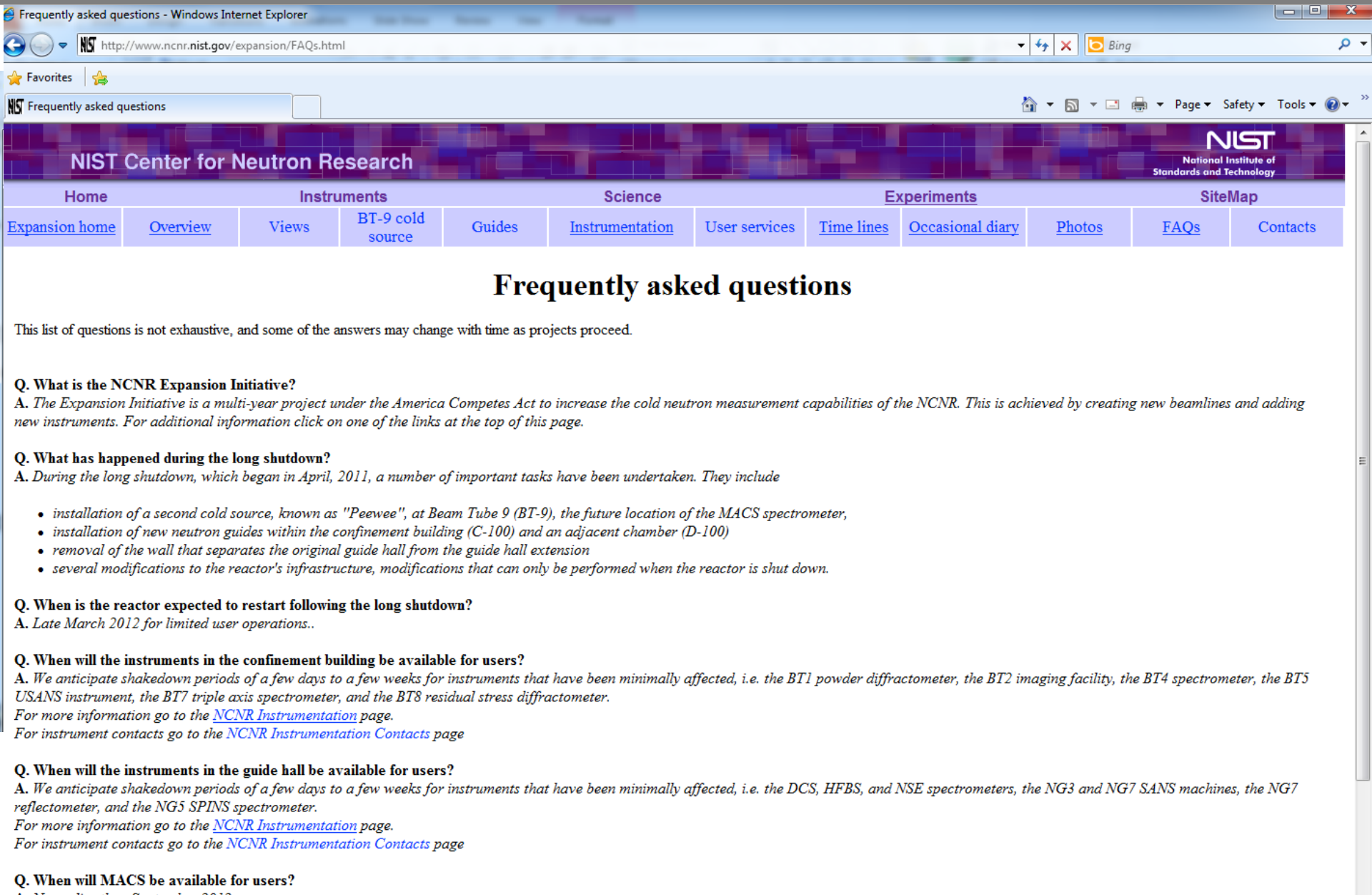
Overview

- Outage retrospective
  - Schedule variance & Risk Management
  - non-Expansion activities
- Current Facility Status
  - Reactor re-start
- Outlook
  - RFO Staffing
  - Jun-Dec, 2012
  - 2013

Reactor Re-start Schedule 2012

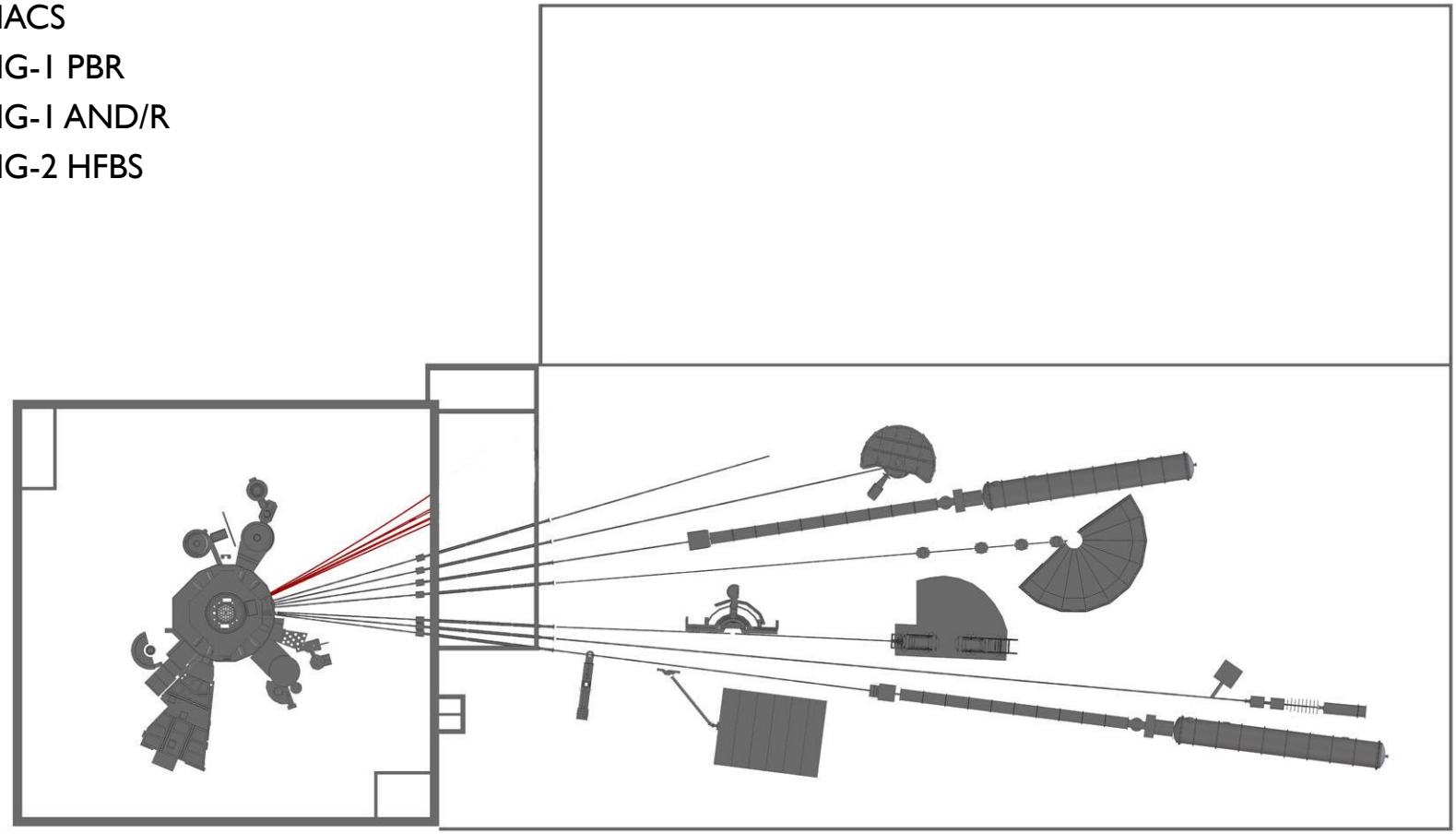
- Contractor begins pre-functional testing SCPB — January
- 100 kW Operations — 8 February
- Liquid hydrogen in both cold sources — 12 March
- 1 MW operations — 15 March
- Beneficial occupancy of SCPB — 21 March
- 5 MW operations — 27 March
  - C-100 instruments operational
- 10 MW operations — 4 April
  - DCS, NG3-SANS, SPINS, NSE, & NG7-SANS operational
- 20 MW operations — 12 April
- First 38 day cycle begins — 26 April

Stakeholder Management



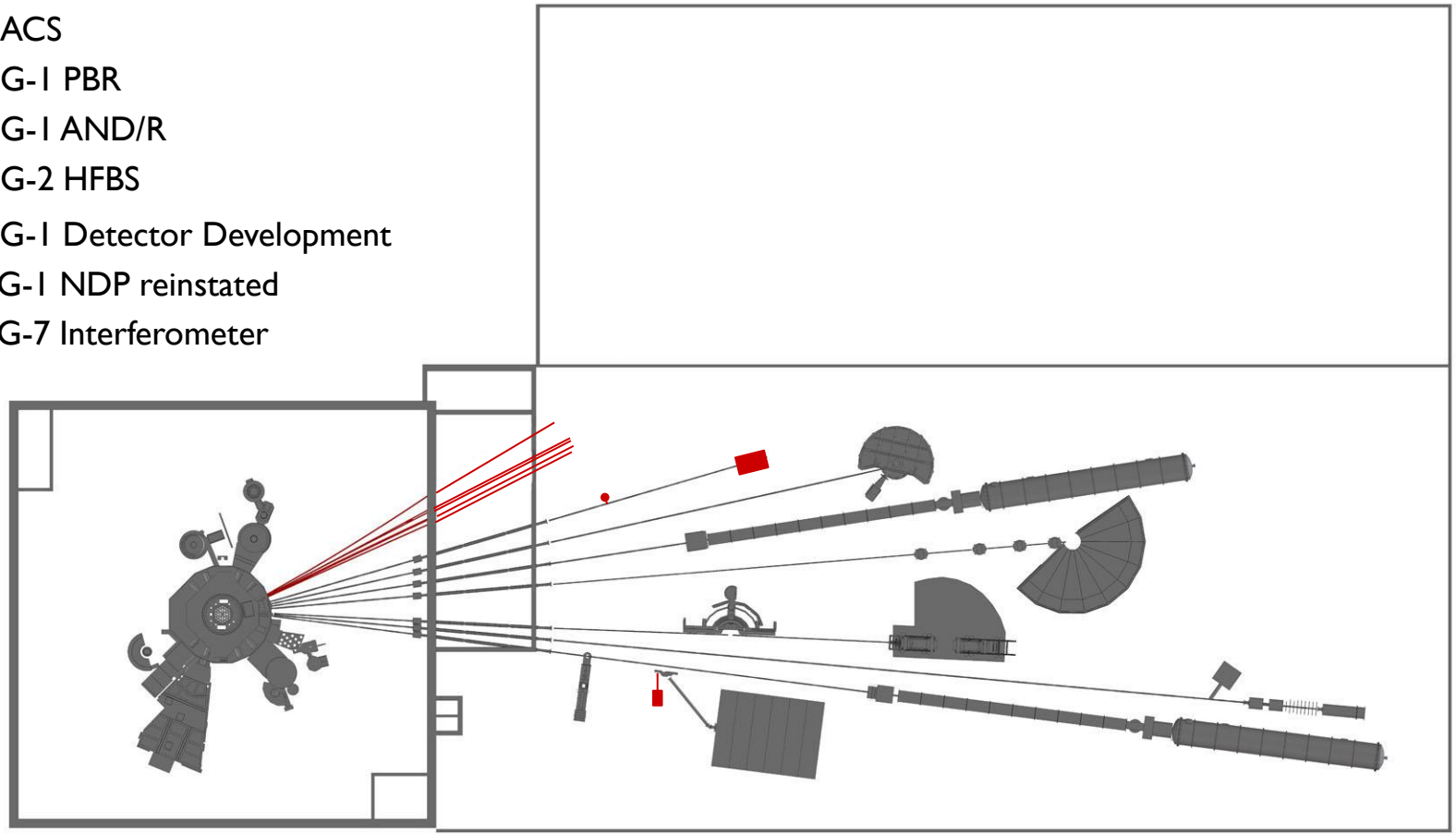
NCNR
Reactor re-start – 28 April, 2012

- MACS
- NG-1 PBR
- NG-1 AND/R
- NG-2 HFBS



NCNR
Reactor re-start – 28 April, 2012

- × MACS
- × NG-1 PBR
- × NG-1 AND/R
- × NG-2 HFBS
- ✓ NG-1 Detector Development
- ✓ NG-1 NDP reinstated
- ✓ NG-7 Interferometer



Overview

- Outage retrospective
  - Schedule variance & Risk Management
  - non-Expansion activities
- Current Facility Status
  - Reactor re-start
- Outlook
  - RFO Staffing
  - Jun-Dec, 2012
  - 2013

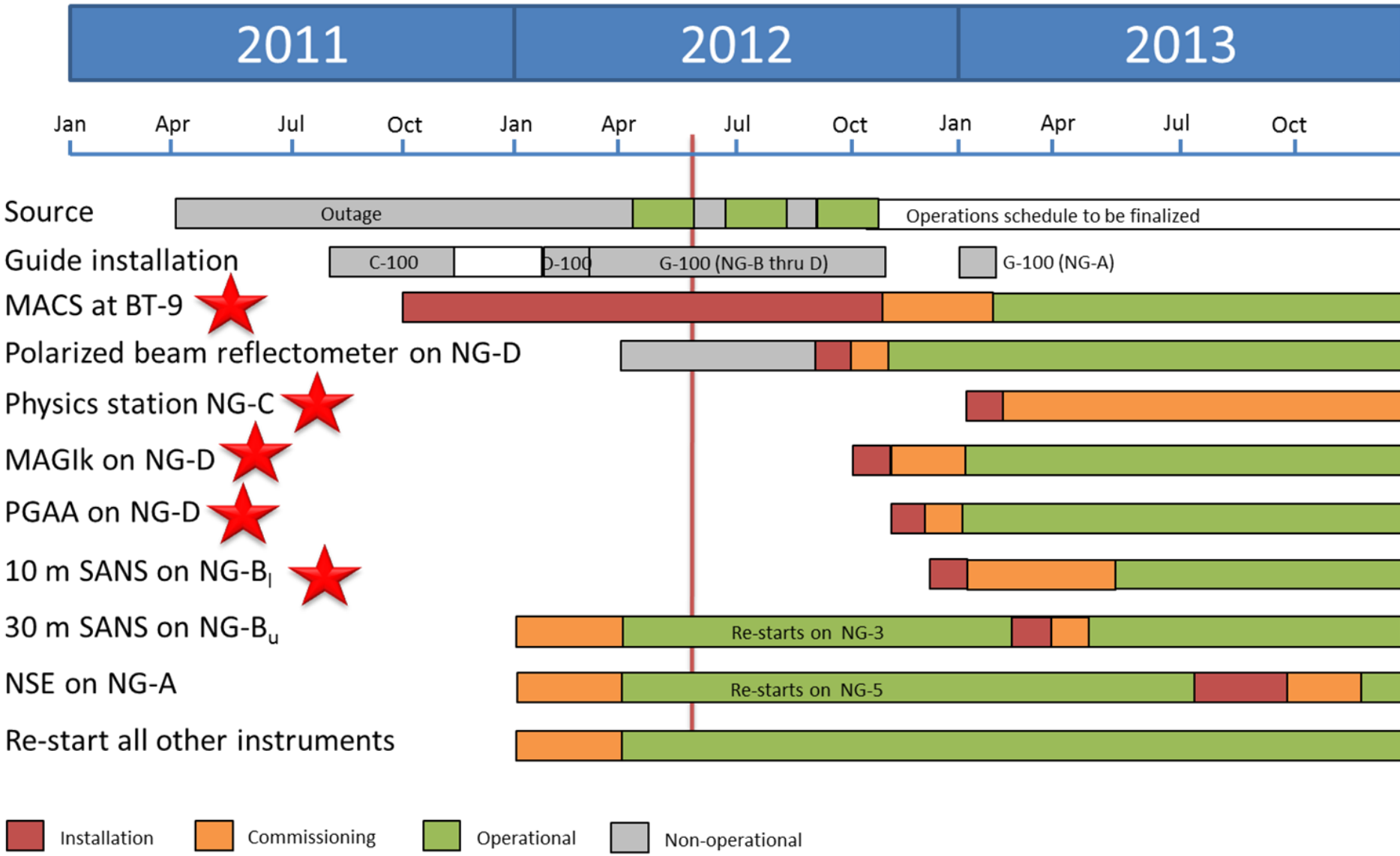
Research Facility Operations

Main Activities: June 2012 – December 2013

- Support for in-house & user science programs
- Completion of Expansion Instruments (Dec 2012)
- Planning & Integrated Scheduling for 2013
  - Remedial work on NG-1→7 masks/windows
  - Complete installation of NG-A
  - 30 m SANS move (NG-3 to NG-B)
  - Neutron Spin Echo move (NG-5 to NG-A)
  - aCORN move (NG-6 to NC-C)
    remediation of NG-C pit?
- Instrument Design & Development
  - vSANS (2015)
  - CANDoR (2016)

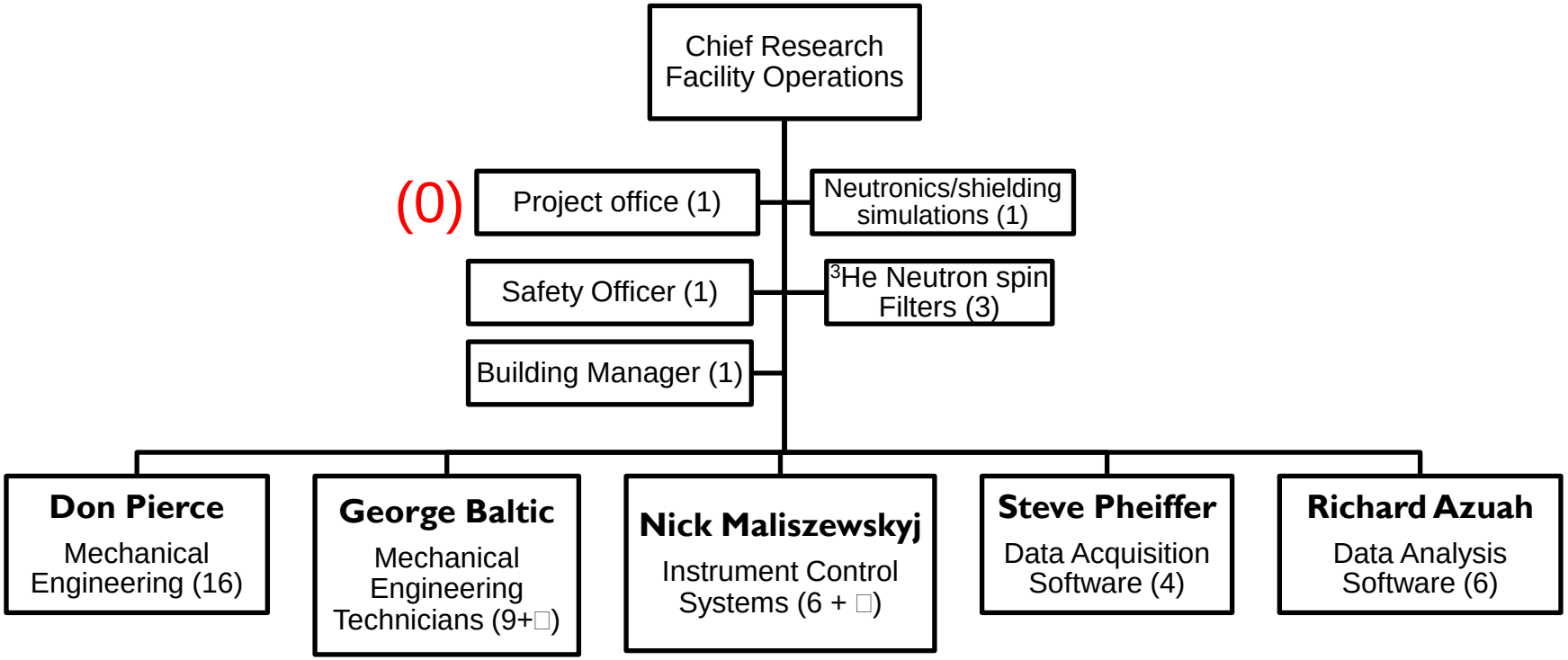
Instrument Start-up Schedules

(Apr 2012)



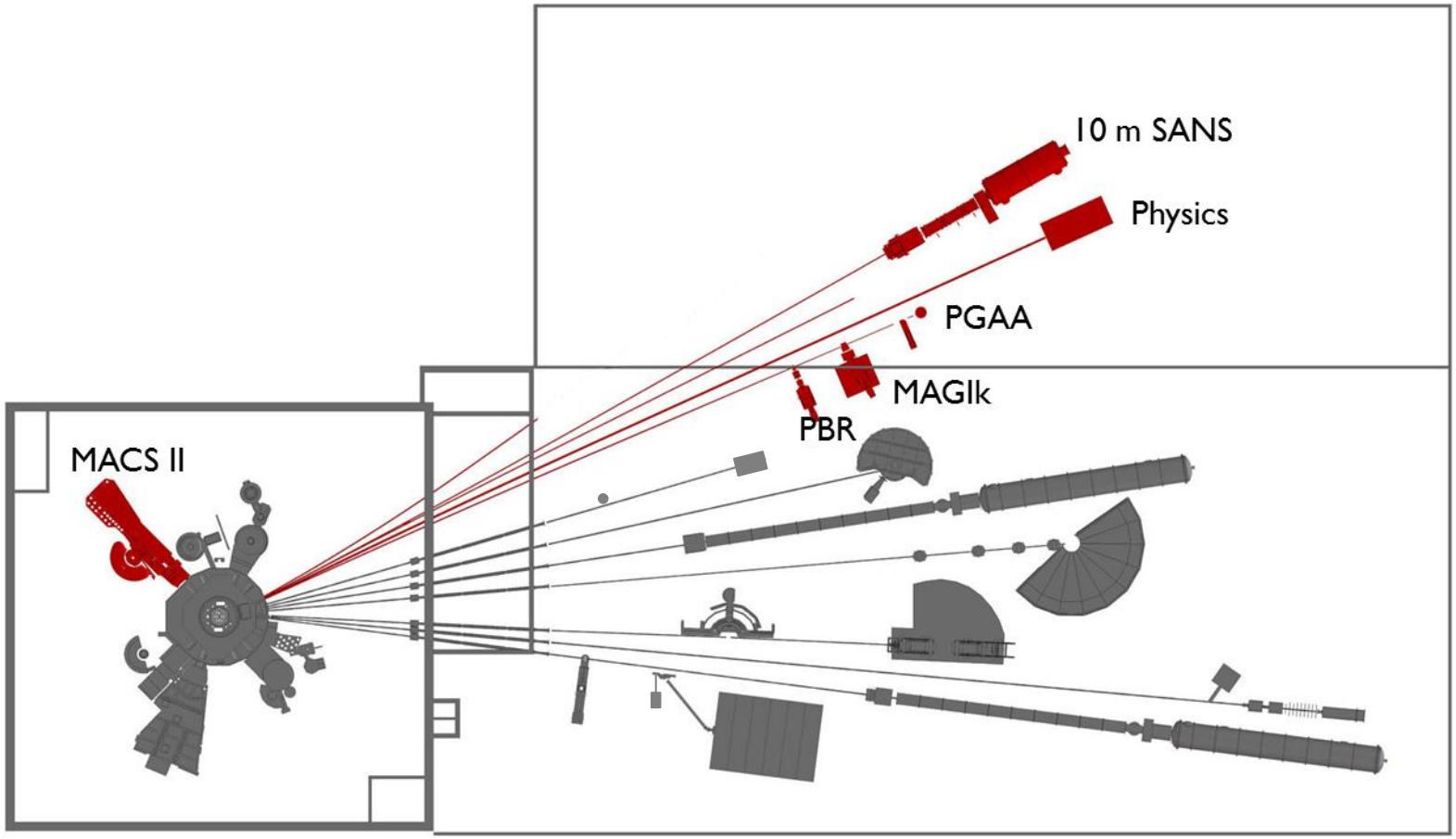
Research Facility Operations

Teams and Team Leaders

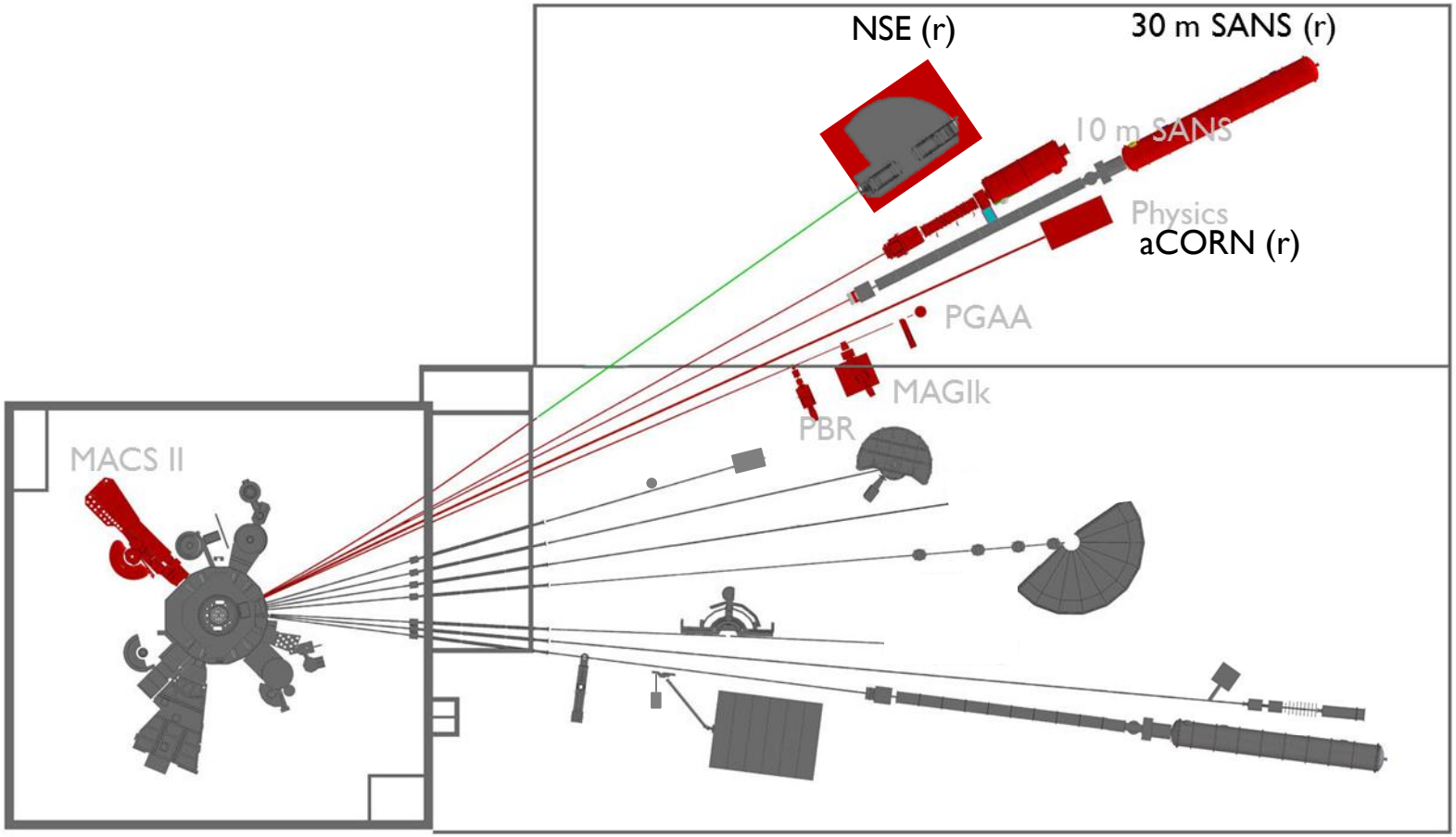


(end of CY 2012)

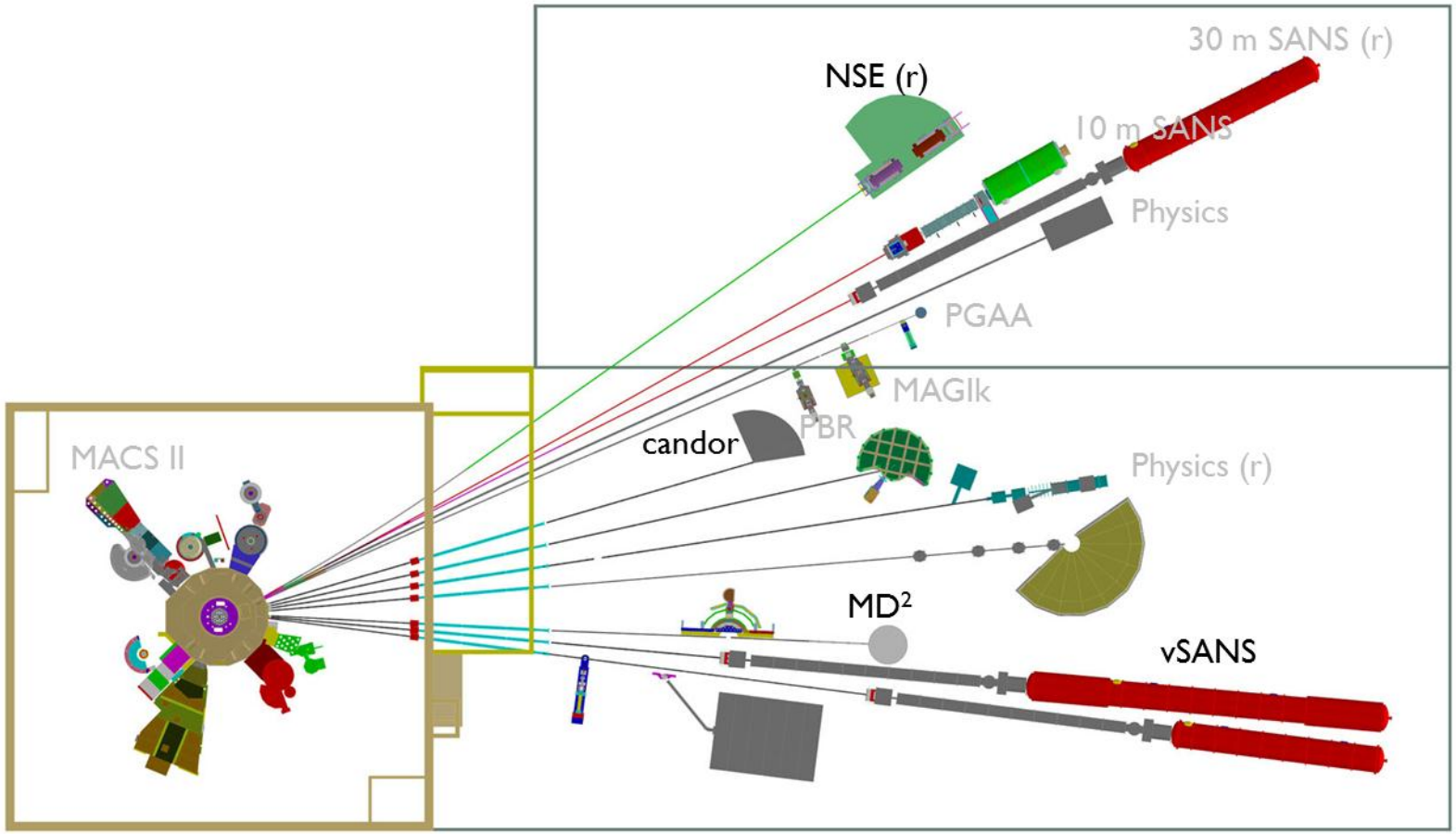
NCNR
31 December, 2012



NCNR
31 December, 2013



NCNR
2015


30 m SANS (r)
NSE (r)
10 m SANS
Physics
PGAA
MAGIk
PBR
candor
MACS II
Physics (r)
MD²
vSANS